3. The substrate processing system of claim 11 further comprising a computer processor communicatively coupled to said impedance monitor so that said computer processor receives as an input the measured impedance level of said plasma.

4. The substrate processing system of claim 3 further comprising a variable capacitor electrically coupled to said chamber and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor.

5. The substrate processing system of claim 3 further comprising a pressure control system configured to control a pressure level within said chamber and controllably coupled to said processor wherein said processor controls said pressure control system to vary the pressure within the chamber in response to the measured impedance level of said plasma.

6. The substrate processing system of claim 3 wherein said processor controls said plasma power source to vary the power applied to the plasma in response to the measured impedance level of said plasma.

7. RESTRICTION REQUIREMENT.

8. RESTRICTION REQUIREMENT.

9. RESTRICTION REQUIREMENT.

10. RESTRICTION REQUIREMENT.

11. A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber; and

an impedance monitor comprising a first impedance probe electrically coupled to said high frequency electrode to measure the impedance at the HF electrode and a second impedance probe electrically coupled to said low frequency electrode to measure the impedance at the LF electrode.

12. The substrate processing system of claim 11 further comprising a variable capacitor electrically coupled to said LF electrode and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor.

13. The substrate processing system of claim 11 further comprising an impedance tuner coupled in series to said pedestal.

14. The substrate processing system of claim 13 wherein said impedance tuner is coupled between said pedestal and a low frequency RF generator.

15. PREVIOUSLY CANCELED.

16. A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber;

an impedance monitor electrically coupled to said high frequency electrode and said low frequency electrode;

a computer processor communicatively coupled to said impedance monitor so that said computer processor receives as an input the measured impedance level of said plasma;

a variable capacitor electrically coupled to said chamber and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable

capacitor to vary the impedance of said plasma in response to an output of said impedance monitor; and

a matching network coupled to a high frequency RF generator and said gas manifold, wherein said matching network has capacitors that are different than said variable capacitor.

17. A substrate processing system comprising:

means for introducing one or more process gases into a reaction zone of a substrate processing chamber;

means for forming a dual frequency plasma from said one or more process gases;

means for maintaining the reaction zone at deposition conditions suitable to deposit a layer from said one or more process gases;

means for monitoring an impedance level of said dual frequency plasma; and

means for adjusting deposition conditions in the reaction zone in response to said impedance level.

18. A substrate processing system as set forth in claim 17 wherein said means for adjusting deposition conditions comprises a variable capacitor electrically coupled to said processing chamber to vary the impedance of said dual frequency plasma.

19. The substrate processing system of claim 14, wherein said impedance tuner includes a variable capacitor.

20. (Thrice amended) A substrate processing system comprising:

a deposition chamber comprising a reaction zone;

a substrate holder that positions a substrate in the reaction zone;

said substrate holder comprising a low frequency (LF) electrode;

a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;

said gas inlet manifold comprising a high frequency (HF) electrode;

a plasma power source for forming a plasma within the reaction zone of said deposition chamber;

an impedance monitor electrically coupled to said high frequency electrode and said low frequency electrode, said impedance monitor including a variable capacitor;

a variable capacitor electrically coupled to said LF electrode and controllably coupled to said processor wherein said processor adjusts a capacitance level of said variable capacitor to vary the impedance of said plasma in response to an output of said impedance monitor; and

a matching network coupled between **[said]** a low frequency RF generator and said variable capacitor, wherein said matching network includes capacitors that are different than said variable capacitor.

21. The substrate processing system of claim 11, further comprising a high frequency power supply coupled to said high frequency electrode and a low frequency power supply coupled to said low frequency electrode.

22. PREVIOUSLY CANCELED.

23. The substrate processing system of claim 4 further comprising an RF matching network electrically coupled to the chamber, and wherein the variable capacitor is separate from the matching network.

--24. The substrate processing system of claim 16 wherein the impedance monitor comprises a first impedance probe connected to the HF electrode and a second impedance probe connected to the LF electrode.

25. The substrate processing system of claim 17 further comprising a substrate holder having a low frequency (LF) electrode, wherein the means for introducing comprises a gas inlet manifold having a high frequency (HF) electrode, and wherein the means for monitoring comprises a first impedance probe connected to the HF electrode and a second impedance probe connected to the LF electrode.

26. The substrate processing system of claim 20 wherein the impedance monitor comprises a first impedance probe connected to the HF electrode and a second impedance probe connected to the LF electrode.--